
TRAFFIC IMPACT ANALYSIS

for

Google Campus Phase 2

Prepared for:
SRM Development
520 6th St S
Kirkland, WA 98033

Prepared by:
William Popp Associates
14-400 Building, Suite 206
14400 Bel-Red Rd
Bellevue, WA 98007

January 22, 2013

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	PROPOSAL.....	1
II.	EXISTING CONDITIONS.....	3
A.	ROADWAY INVENTORY	3
B.	TRAFFIC VOLUMES	5
C.	TRANSIT SERVICE	5
D.	CITY PROGRAMMED IMPROVEMENTS.....	8
III.	TRIP GENERATION	8
IV.	TRIP DISTRIBUTION AND ASSIGNMENT	12
V.	TRANSPORTATION CONCURRENCY	13
VI.	SIGNIFICANT TRAFFIC IMPACT.....	16
VII.	FUTURE YEAR (YEAR 2017) TRAFFIC ESTIMATES.....	18
VIII.	LEVEL OF SERVICE ANALYSIS	23
IX.	SITE ACCESS	27
A.	SITE ACCESS CIRCULATION.....	27
B.	POTENTIAL NEIGHBORHOOD IMPACTS	28
C.	DRIVEWAY QUEUING	28
D.	SIGNAL WARRANTS AT SOUTH DRIVEWAY	29
X.	ON-SITE PARKING	32
XI.	TRANSPORTATION DEMAND MANAGEMENT PLAN (TDM).....	32
XII.	SUMMARY	34
A.	TRIP GENERATION, TRIP DISTRIBUTION & ASSIGNMENT.....	34
B.	CONCURRENCY, SIGNIFICANT INTERSECTIONS.....	34
C.	LEVEL OF SERVICE.....	35
D.	DRIVEWAY QUEUE.....	36
E.	SIGNAL WARRANTS	36
F.	MITIGATION FEE ANALYSIS.....	37
G.	FRONTAGE IMPROVEMENTS	37

I. Introduction

The following traffic study was prepared in accordance with the Traffic Impact Analysis Guidelines for proposed developments in the City of Kirkland. This study summarizes the project trip generation, concurrency results including project distribution and assignment, intersection impacts and level of service, site access issues, and mitigation issues.

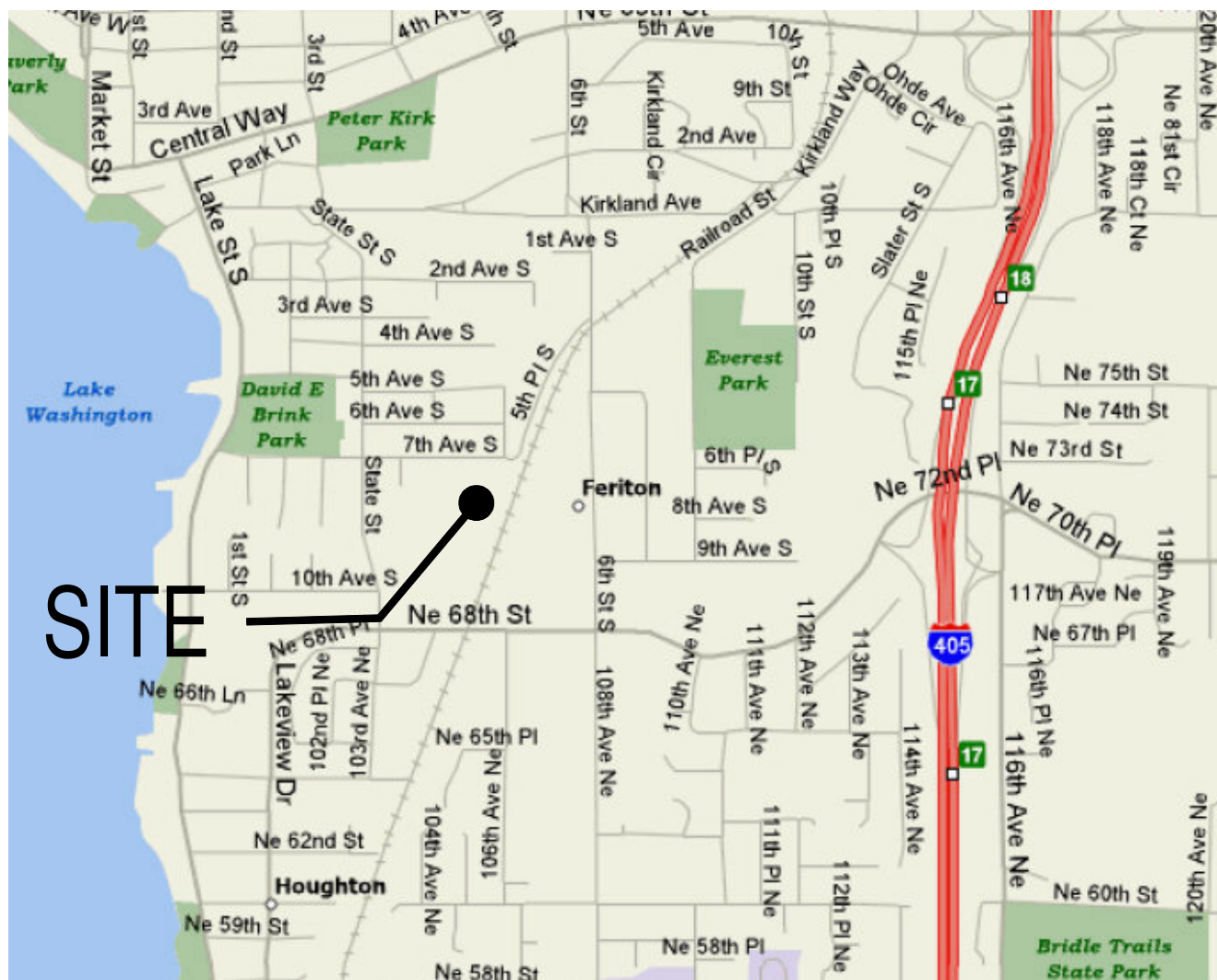
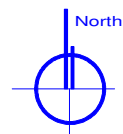
According to the City's transportation guidelines, all commercial developments (non-residential) of more than 4,000 square feet with associated parking of 20 or more spaces are subject to environmental review under the State Environmental Policy Act (SEPA) and to road concurrency evaluation under the City's Concurrency Management Ordinance. The traffic impact analysis guidelines and subsequent analysis will assist in the determination of project compliance with transportation concurrency requirements, allow a thorough and complete review of potential traffic impacts, and ensure that review and mitigation of all proposals occur in a consistent and equitable manner.

A. Proposal

SRM Development LLC is proposing development of a new office building as part of the Google Office Park. The site abuts to the west side of the existing Google campus, on the west side of the railroad tracks and south of 7th Ave S (the north end of the property fronts 7th Ave S). The Parcel Number is 7882600120. The site was formerly the Pace Chemical Company but is currently vacant. The property has been vacant for more than one year thus there will be no trip credits taken for the future analysis. A vicinity map is presented in Figure 1.

The proposal is slated to consist of approximately 180,000 gsf of office use, Google Office Park Phase 2. There will two proposed access points, one at the north end of the site and one at the south end of the site. The north access will connect near the junction of 7th Ave S and 5th Pl S. The access will be designed such that no trips from the site can enter or exit to 7th Ave S. The south access will connect with the existing Google Campus south end roadway parking lot circulation network and ultimate access will be to 6th St S at most likely the existing Google south driveway. Currently there are two driveways to the existing Google Campus with each driveway near the property line. The distance between the two existing driveways to 6th St S is approximately 800 feet apart. Each driveway is approximately 36 feet wide and includes two exit lanes and one entrance lane.

The total proposed parking garage will provide for 746 stalls. The parking garage will be two levels P1 and P2 with 371 stalls on P1 and 375 stalls on P2. There are two access points to P1, one at the south end and one at the north end. Vehicles can circulate the full P1 level and ingress/egress at either end. There are also two access points to P2. These



two driveways are both on the west end of the site and the driveways are located closer to the center of the garage. There are no ramps between P1 and P2.

A site plan is presented in Figure 2.

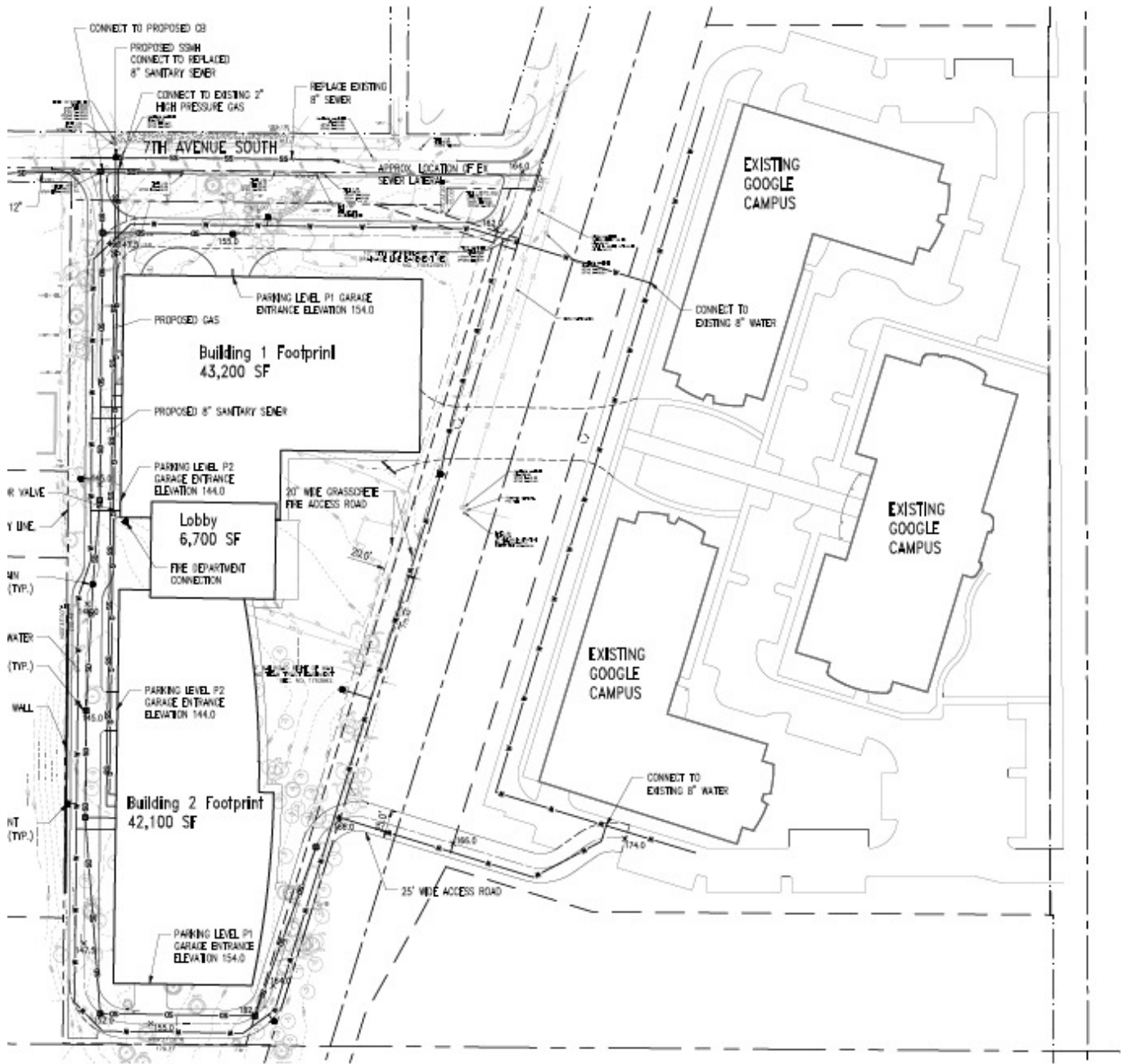
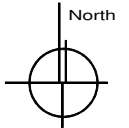
II. Existing Conditions

The existing conditions section identifies the roadway and channelization features, traffic volumes, transit, and site access sight distance.

A. Roadway Inventory

The primary existing road system utilized by project traffic would be 6th St, NE 68th St, and Kirkland Way. These streets are discussed below.

- 6th St (aka 108th Ave NE) is a two to three lane minor arterial with long range connection between Central Way to the north and Northup Way to the south. Between NE 68th St and 9th Ave S, the roadway includes a single lane each direction plus bike lanes and parallel on-street parking both sides. In addition there is curb, gutter and sidewalks both sides. In the site vicinity, between 9th Ave S and the 500 block to the north, the roadway includes a single lane each direction plus a center two-way left-turn lane. In addition, there are bike lanes both directions, as well as curb, gutter and sidewalk both sides. No on-street parking is permitted in this section. North of the 500 block up to 5th Pl S, the center two way left turn lane ends and the roadway returns to a single lane each direction, plus bike lanes, and on-street parallel parking along with curb and gutter both sides and sidewalk on east side. There are 11 driveways on the opposite side of the street along the site frontage. The posted speed limit is 30 mph south of Kirkland Ave.
- NE 68th St / NE 70th Pl is a three lane minor arterial connecting Houghton community with I-405 as well as connection to Lake Washington Boulevard. There are curb, gutters, and sidewalks on both sides as well as bike lanes. Marked pedestrian crosswalks are located at all of the signalized intersections along this roadway. The posted speed limit is 25 mph in the vicinity of 6th St.
- Kirkland Way is a two lane minor arterial connecting between the downtown waterfront and NE 85th St near I-405. There are partial curb, gutters, and sidewalks along the roadway as well as some on-street parking. The posted speed limit is 30 mph east of 6th St S and 25 mph west.



Traffic Volumes

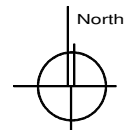
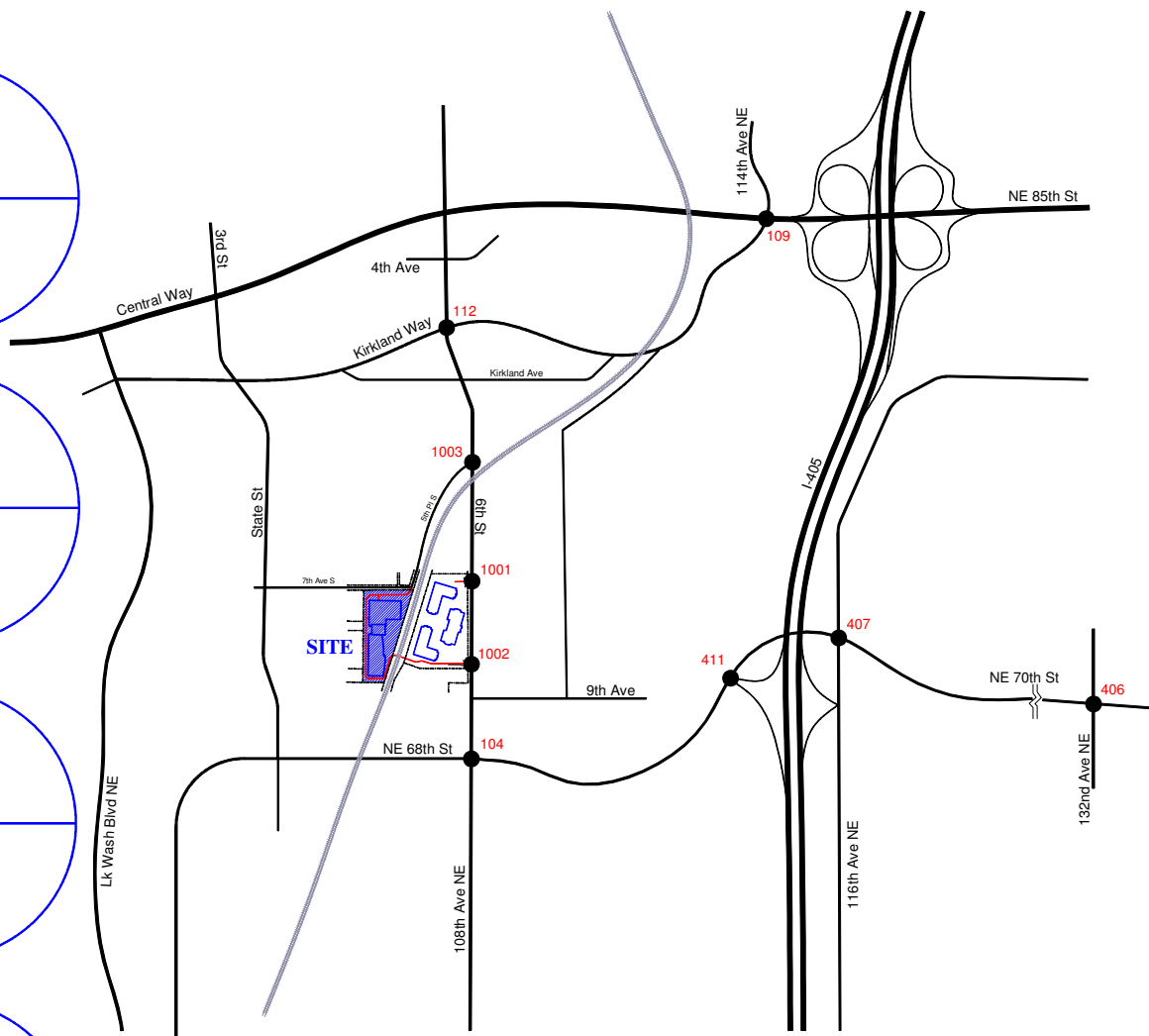
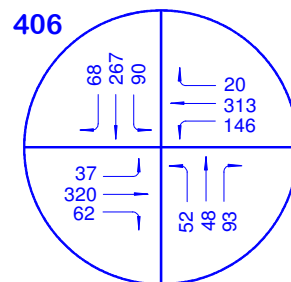
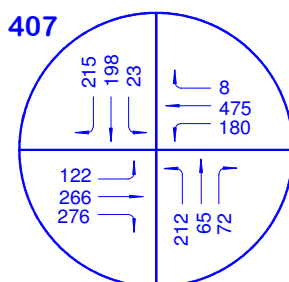
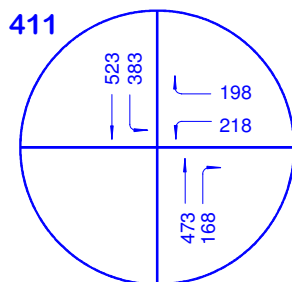
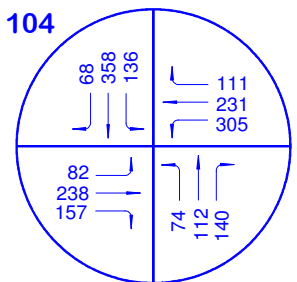
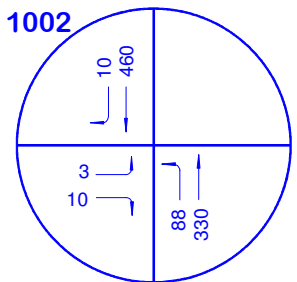
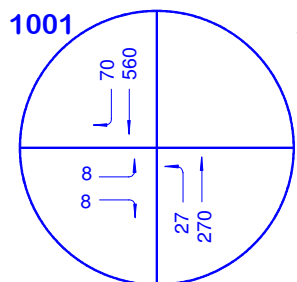
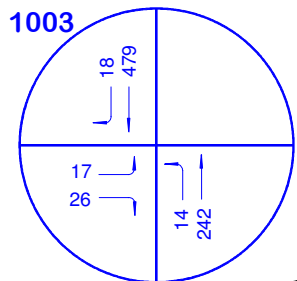
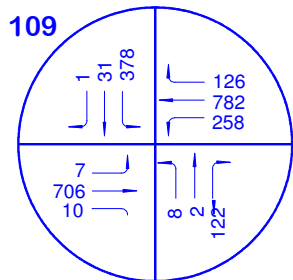
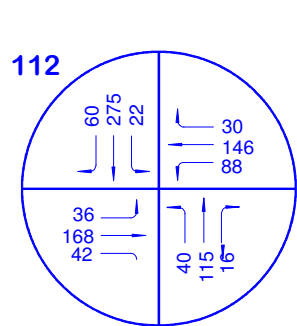
Traffic volumes and historical trends on selected study area links are as follows:

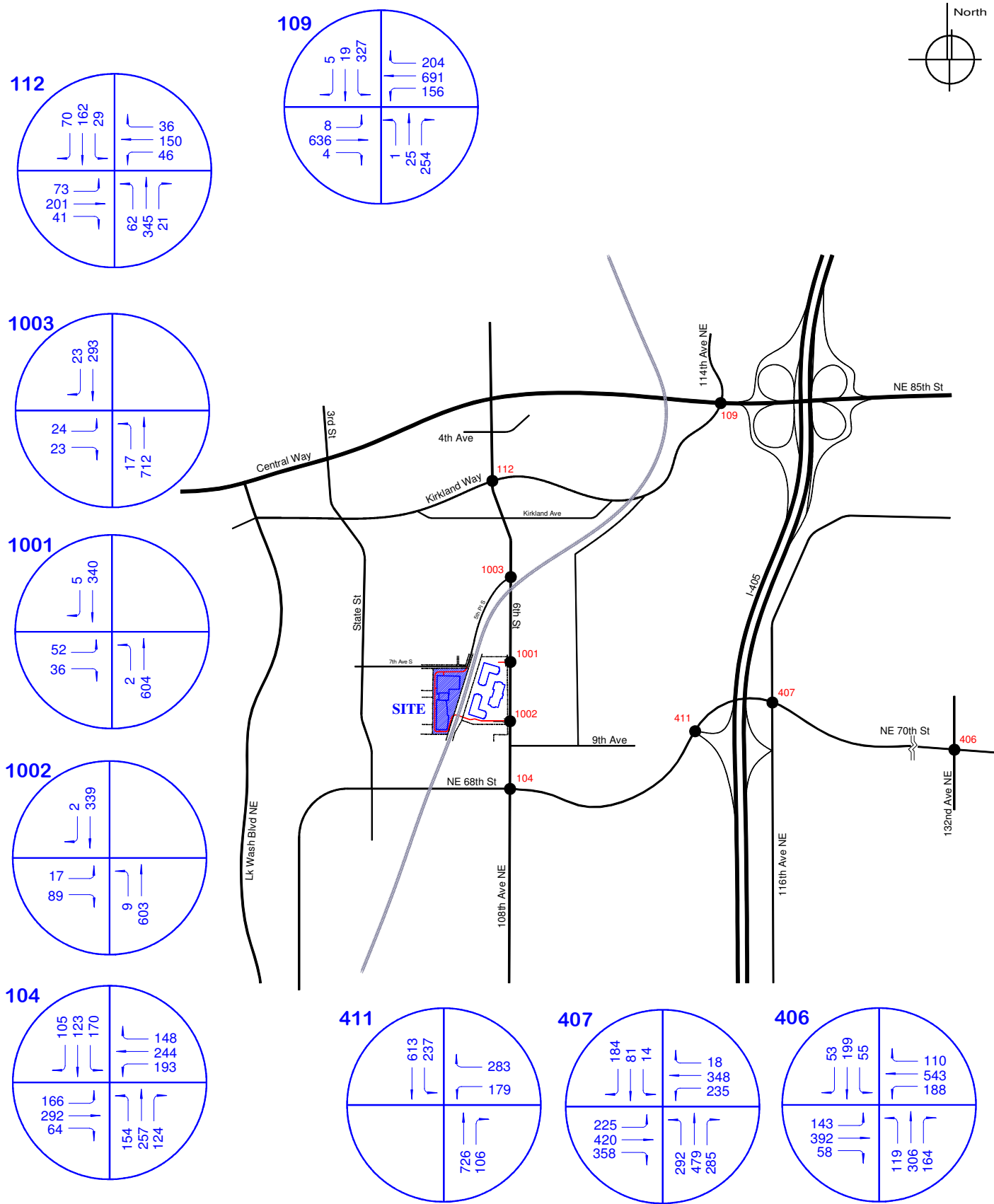
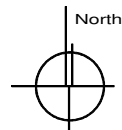
- 6th St S north of NE 68th St: The estimated 2012 Average Weekday Daily Traffic (AWDT) on this arterial north of NE 68th St is approximately 10,900 vehicles per day (vpd), and the PM peak hour volume is approximately 970 vehicles; 400 southbound and 570 northbound. According to historical AWDT traffic count records, the daily traffic volume on this roadway has remained relatively constant since 1997 with some minor peaking in the 2000 era.
- NE 68th St east of 6th St S: The 2012 Average Weekday Daily Traffic (AWDT) on this arterial is estimated to be approximately 18,700 vehicles per day (vpd), and the PM peak hour volume is approximately 1,170 vehicles; 585 westbound and 585 eastbound. Similar to 6th St S, according to historical AWDT traffic count records, the daily traffic volume on this roadway has remained relatively constant since 1997 with some minor peaking in 2001 era.
- Kirkland Way east of 6th St S: The 2012 Average Weekday Daily Traffic (AWDT) on this arterial is estimated to be approximately 5,665 vehicles per day (vpd), and the PM peak hour volume is approximately 480 vehicles; 230 westbound and 250 eastbound. According to historical AWDT traffic count records, the daily traffic volume on this roadway has increased at an annual growth rate of just under 1% per year since 1997.

The existing AM and PM peak hour turning movement volumes at selected intersection are shown in Figure 3 and 4 respectively. The City provided the traffic volumes at the outlying intersections. TDG conducted all of the driveway counts as well as the count at the 6th St S/5th Pl S intersection. All of the outlying intersections were selected for further study based on the City's proportional share worksheet calculations, discussed later. The local area intersection including the two driveways were counted and analyzed for site access considerations.

B. Transit Service

King County Metro currently provides several bus routes along the site frontage on 6th St S. These routes would include 245, 255 and 540. There are bus stops on both sides of the street in the vicinity of the site. In addition, there are 13 bus routes that stop in the vicinity of the I-405/NE 70th St interchange and neighboring Bridle Trails Park & Ride. Route 245 provide access between the site and this major transfer location. Route 255 provides access to the South Kirkland P&R. Route 540 is an Express Sound Transit line that runs between downtown Kirkland and the University District. The bus stop for this route is at the south end of the site both sides of 6th St S.





C. City Programmed Improvements

According to the City of Kirkland's Capital Facilities Plan, there are several proposed projects that will affect the intersections being analyzed in this traffic study. They would include:

- 6th St/Kirkland Way Traffic Signal. This project would involve changing the intersection control from all-way stop to a traffic signal. This project will not include left turn pockets on east and west approaches, however, the painted island on the south leg is presumed to be modified to a turn pocket with the new signal.
- NE 85th St/114th Ave NE Intersection Improvements. Recent improvements have been made including widening of the north leg to include dual southbound left turn lanes. Future improvements are likely to include HOV Queue Bypass lanes east and west directions. However, these improvements are not included in the horizon year of this study (2017).
- NE 68th St/108th Ave NE Intersection Improvements. This project was recently constructed and included addition of a westbound right turn lane.

III. Trip Generation

Trip generation for the proposed Phase 2 of the Google Campus was based on driveway counts conducted at the site for both the AM and PM street peak periods or the existing Google campus.

For the AM peak period, driveway counts were conducted Thursday 10/4/12, Tuesday 10/9/12, and Wednesday 10/10/12. The counts were conducted between 7:30am and 9:30am for the Thursday and Tuesday counts, however the count was extended to 10:00am for the Wednesday count due to a slight increase in driveway activity during the 9:15 to 9:30am interval.

For the PM peak period, the driveway counts were conducted Wednesday 10/3/12 and Tuesday 10/9/12 between 4:30pm and 6:30pm. In addition, the City provided a PM count conducted at the site Wednesday 10/19/11 that was subsequently added to the PM dataset.

All counts including the City authorized count were conducted by Traffic Data Gathering (TDG). The counts included pedestrian (most of which presumed via transit) and bicycle trips. Those numbers are not included herein as this is intended for vehicular trip generation for the City's model concurrency test.

The traffic counts are summarized in Table 1.

Table 1
Google Driveway Count Summaries ^a

Day	Date	Pk Hr (Begin)	Driveway	LT IN	RT IN	LT OUT	RT OUT
AM PEAK							
Thur	10/4/2012	8:15 AM	North	29	62	8	10
Tue	10/9/2012	8:30 AM	North	32	79	10	7
Wed	10/10/2012	8:30 AM	North	21	70	5	7
			Avg	27	70	8	8
				28%	72%	49%	51%
Thur	10/4/2012	8:30 AM	South	84	10	3	13
Tue	10/9/2012	8:30 AM	South	89	10	1	6
Wed	10/10/2012	8:45 AM	South	90	11	4	11
			Avg	88	10	3	10
				89%	11%	21%	79%
BOTH DRIVEWAYS				115	81	10	18
				from the south	from the north	to the north	to the south
				59%	41%	36%	64%
BOTH DRIVEWAYS TOTAL AM				TOTAL IN 196		TOTAL OUT 28	
				224			
PM PEAK							
Thur	10/3/2012	5:00 PM	North	3	4	52	38
Tue	10/9/2012	5:15 PM	North	0	6	52	33
			Avg	2	5	52	36
				23%	77%	59%	41%
Thur	10/3/2012	5:00 PM	South	10	2	15	104
Tue	10/9/2012	5:15 PM	South	7	1	18	74
			Avg	9	2	17	89
				85%	15%	16%	84%
Thur	10/3/2012	Both Driveways		LT IN	RT IN	LT OUT	RT OUT
Tue	10/9/2012	Both Driveways		13	6	67	142
Wed	10/19/2011 ^b	Both Driveways		7	7	70	107
			Avg	9	6	78	71
				10	6	72	107
				from the south	from the north	to the north	to the south
				60%	40%	40%	60%
BOTH DRIVEWAYS TOTAL PM				TOTAL IN 16		TOTAL OUT 178	
				194			

^a for both the north and south driveways.

^b Count authorized by City, conducted October 2011 (data only available for summary of both driveways)

As shown in Table 1, for the AM peak hour, the total trips to/from the site was observed to be 224 trips with 196 in and 28 out. The peak hour in general runs between 8:30 and 9:30 am. Also, approximately 60% of the trips are to/from the south, and most of the trips most of the trips to/from the south use the south driveway. For the PM peak hour,

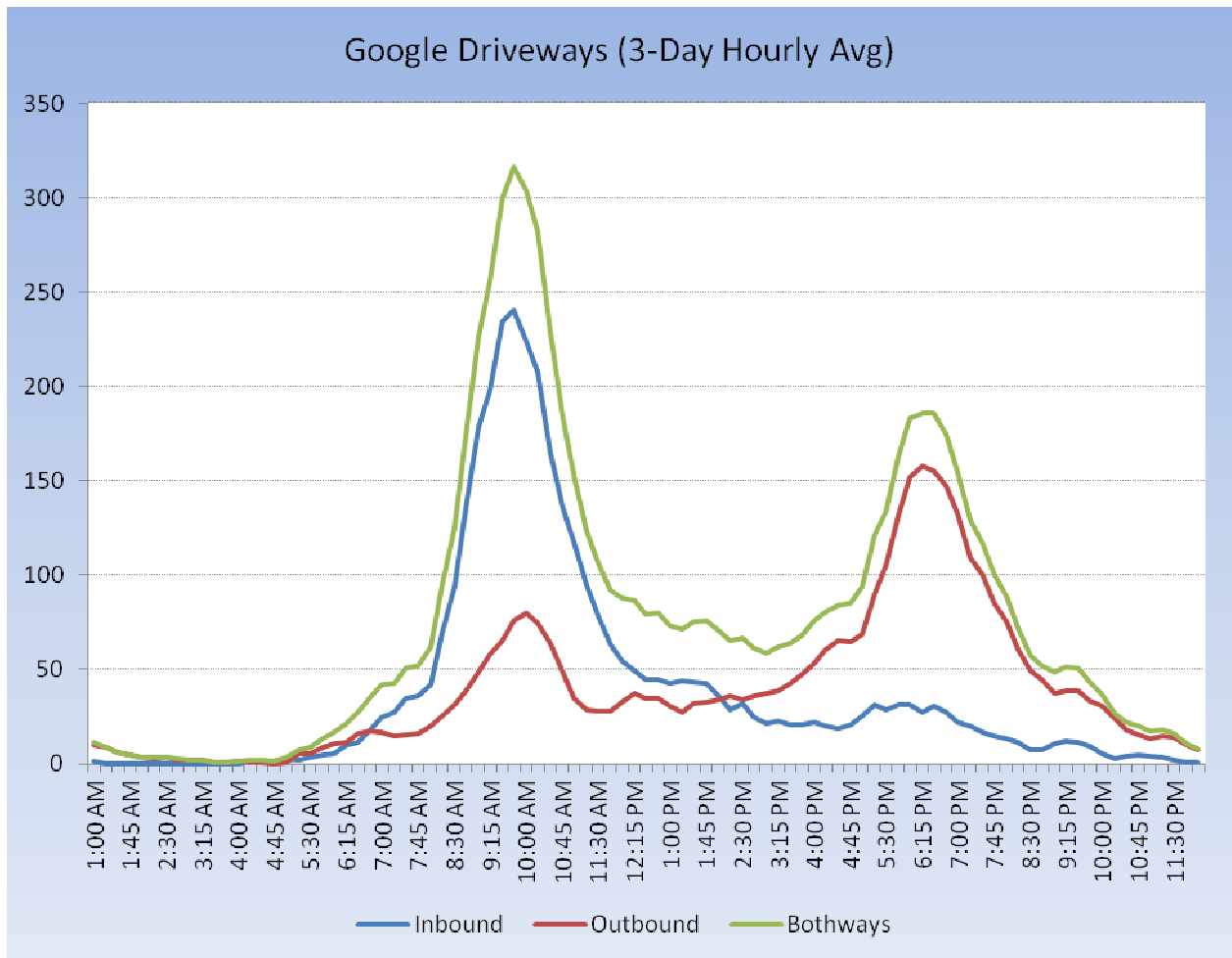
the total trips to and from the site was observed to be 194 trips, with 178 exiting and 16 entering. In general, the PM peak hour runs between 5:15 and 6:15. In addition, the orientation of trips is 60% to and from the south.

Based on this count information, a local trip rate was determined for both the AM and PM peak hours. The derivation of the local rates are as follows:

1. AM Peak Hour: The AM peak hour volume for Phase 1 of the Google Campus is 224 trips. The gross floor area is 194,825 gsf. Thus, the AM peak hour trip rate is 1.15 trips per ksf. The directional distribution split is 87% entering and 13% exiting.
2. PM Peak Hour: The PM peak hour volume for Phase 1 of the Google Campus is 194 trips. Using the same gross floor area of 194,824 gsf, this equates to a PM peak hour trip rate of 1.00 trips per ksf. The directional distribution split is 8% entering and 92% exiting.

The daily estimate was based on subsequent 24-hour counts conducted at each driveway for entering and exiting traffic. The counts were conducted between Tuesday October 23, 2012 and Thursday October 25, 2012. The 3-day average indicated a daily volume of 1,822 trips both in and out.

Approximately 43% of these trips were at the north driveway and 57% were at the south driveway. Assuming a gross floor area of 194,824 gsf, the daily trip rate for the existing Google Campus is approximately 9.35 trips per ksf.



These local trip rates and in/out splits were utilized to estimate the peak hour trips for the proposed Phase 2 project. The trip generation estimates for Phase 2 are presented in Table 2.

Table 2
Trip Generation ^a

Land Use	AWDT	AM Peak			PM Peak			
		Total	In	Out	Total	In	Out	
Proposal: Google Campus Phase 2 Office								
180 ksf	Rate	9.35	1.15	87%	13%	1.00	8%	92%
	Vol	1,684	207	181	26	180	15	165

^a trip rates for Daily, AM and PM peak hours based on local counts.

As shown in Table 2, the Google Campus Phase 2 project is estimated to generate a total of 1,684 daily, 207 AM and 180 PM peak hour trips to and from the site.

IV. Trip Distribution and Assignment

The distribution and assignment of project PM peak hour trips was performed by the City using the City's traffic model as part of the transportation concurrency test. The PM assignment was partially based on the existing traffic counts at the driveways provided to the City. The AM trip assignment was conducted by WPA and was, as instructed by City, a reversal of the PM percentages.

The results for the PM assignment suggest the following distribution at the project site access:

- 49% of the project trips enter/exit the site from the north on 6th Street S.
- 51% of the project trips enter/exit the site from the south on 6th Street.

It was assumed that the trips in and out of the two project driveways would be evenly split.

The outlying distribution is as follows:

- 38% of the project trips are to/from the east on NE 68th St.
- 10% of the project trips are to/from the south on 108th Ave NE.
- 4% of the project trips are to/from the west on NE 68th St.
- 26% of the project trips are to/from the east on Kirkland Way to NE 85th St (west of I-405).
- 15% of the project trips are to/from the north on 6th St north of Kirkland Way.
- 8% of the project trips are to/from the northwest on Central Way, Market St Kirkland Way, and Lake St.

As mentioned earlier, the proposed Phase 2 site plan will have direct access to 5th Pl S as well as to the south end of the existing campus. Therefore, project traffic is expected to access 6th St S at either the existing Google campus driveway or at 5th Pl S. It is estimated that no traffic from the Phase 2 project will use the existing northerly Google driveway. The local area trip assignment assumed approximately 90% of the traffic to and from the north would use the 5th Pl S roadway, and 10% of these same trips would use the south driveway. All of the trips from Phase 2 to and from the south are expected to use the south driveway.

Given this likely increases in traffic at the south driveway from Phase 2, it is anticipated that some of the Phase 1 trips that typically use the south driveway may shift to the existing north driveway for ingress/egress. However, it should be noted that the future

driveway operations analysis including signal warrants assume no shift in Phase 1 traffic between the two existing driveways.

The assignment of project weekday daily, AM and PM peak hour trips for Phase 2 are shown in Figures 5 and 6 respectively. It is important to note that the PM peak hour trip assignment is taken from the City's concurrency run.

V. Transportation Concurrency

The City of Kirkland conducted a traffic concurrency test for this project and provided the results in a memorandum to the Planning Department dated 10/29/12. The memorandum and concurrency results are attached. The project passed concurrency. The concurrency test notice shall expire and a new concurrency test application is required unless:

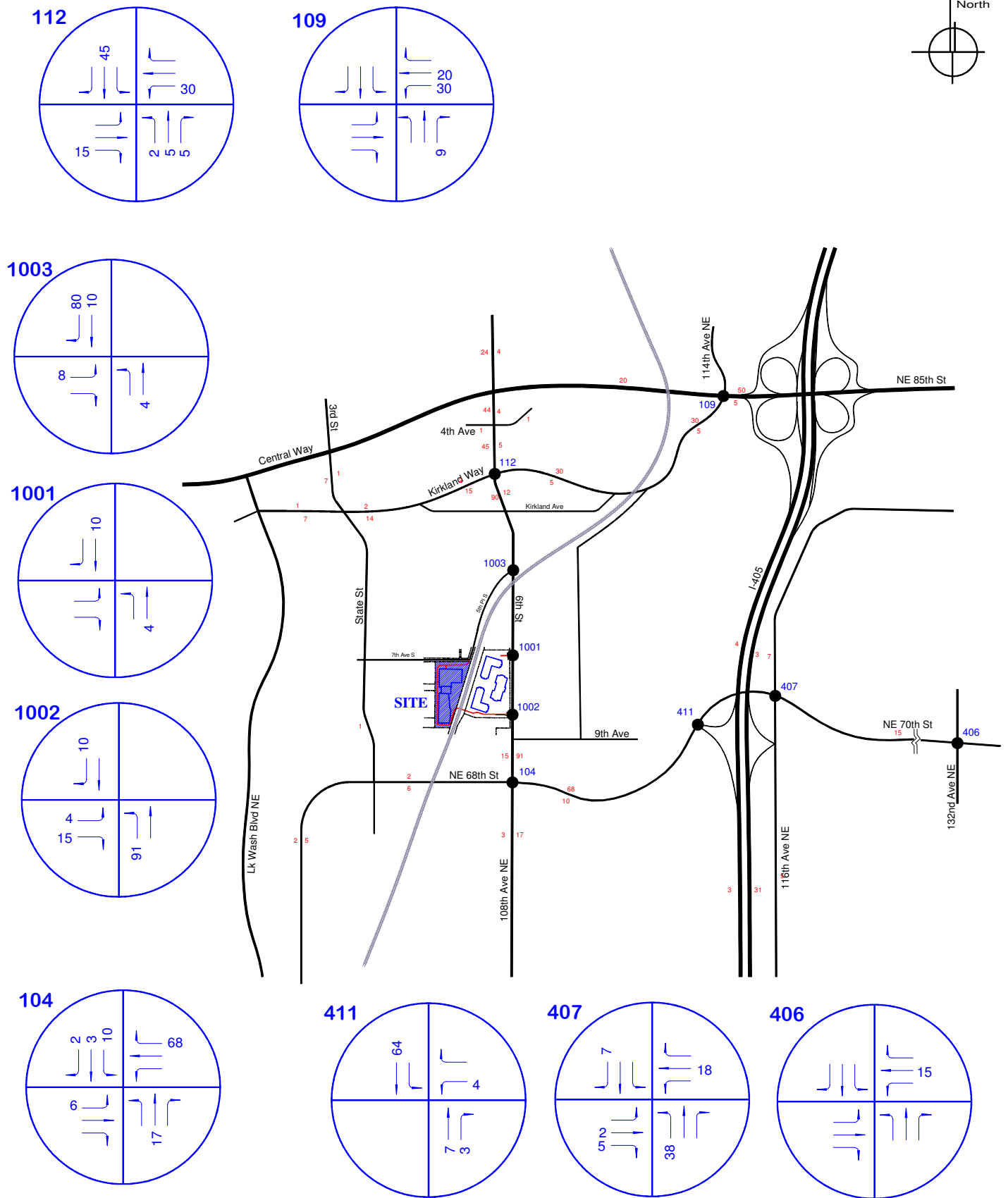
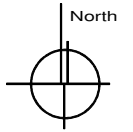
1. A complete SEPA checklist, traffic impact analysis and all require documentation are submitted to the City within 90 calendar days of the concurrency test notice
2. A Certificate of Concurrency is issued or an extension is requested and granted by the Public Works Department within one year of issuance of the concurrency test notice. A Certificate of Concurrency is issued at the same time a development permit or building permit is issued if the applicant holds a valid concurrency test notice.

Please refer to the memo for additional details including expiration dates.

There are five subareas defined as part of concurrency. No designated concurrency intersection can exceed a v/c ratio of 1.4, and the subarea v/c ratio cannot exceed the defined threshold. The results indicate no concurrency intersection will exceed a v/c of 1.4 and all of the subareas are below thresholds. The subarea v/c standards and concurrency results are:

- The Southwest v/c standard is 0.90. The v/c with project is 0.64.
- The Northwest v/c standard is 0.94. The v/c with project is 0.78.
- The Northeast v/c standard is 0.92. The v/c with project is 0.74.
- The East v/c standard is 1.07. The v/c with project is 0.88.
- The North subarea does not have a subarea v/c threshold.

It should be noted that the concurrency test was run with a trip generation assumption of 186 PM peak hour trips, with 170 out, and 16 in. This is slightly higher than the trip generation estimates noted in Section III.



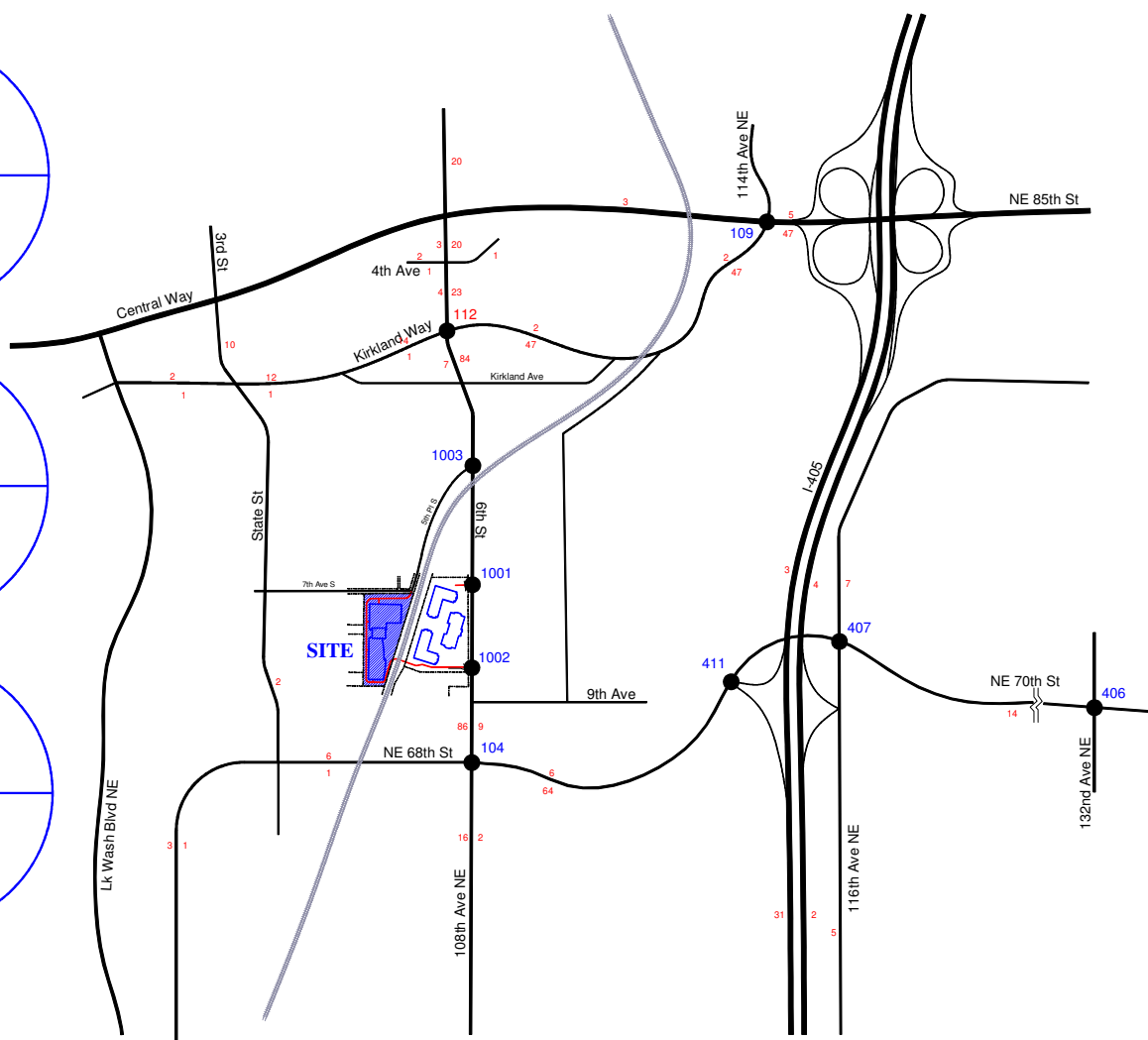
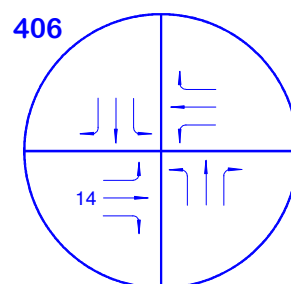
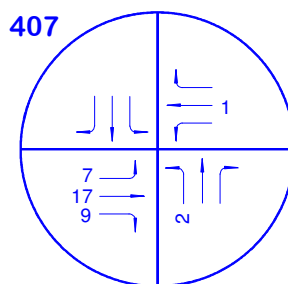
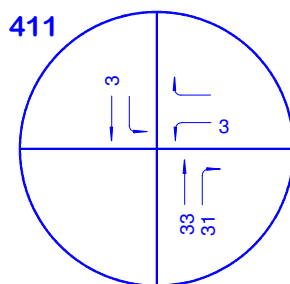
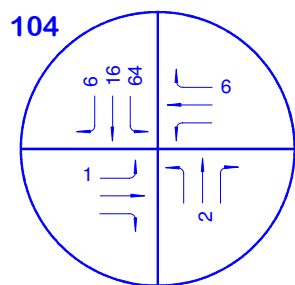
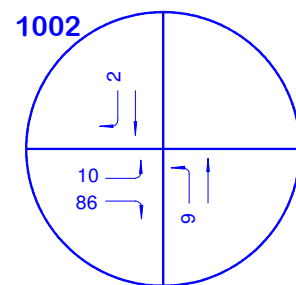
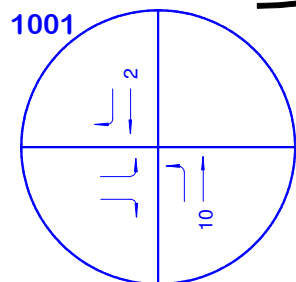
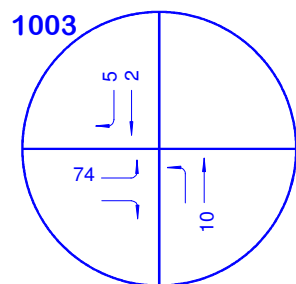
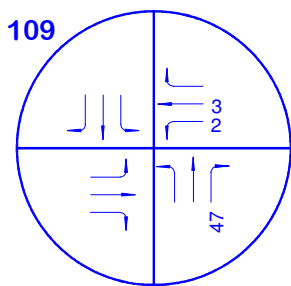
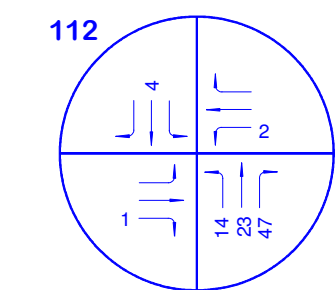
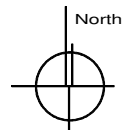
WILLIAM POPP ASSOCIATES

Bellevue, WA 98007
425.401.1030

AM PEAK PROJECT VOLUMES

Google Office Park
PHASE 2
SRM Development LLC

Figure 5



VI. Significant Traffic Impact

The City's analysis guidelines require analysis of all intersections where the project's proportional share is greater than 1%. These intersections are defined as significant intersections.

Based on project trip distribution and assignment, there are eight intersections that are identified as significant. All intersections reviewed and those defined as significant, or not, are shown in Table 3. The intersections reviewed included all intersections identified in the concurrency run.

Table 3
Significant Intersection Check

	Intersection	Project AWDT ^a	Proportional Share ^b	Significant? ^c
101	Lake Wash/NE 38th Pl	19	0.1%	No
102	Lake Wash/Lakeview Dr	28	0.2%	No
103	State St/NE 68th St	56	0.2%	No
104	108th Ave NE/NE 68th St	805	5.4%	Yes
105	Central Way/6th St	215	0.6%	No
106	Central Way/3rd St	94	0.9%	No
107	Central Way/Lake St	9	0.1%	No
108	Lake St/Kirkland Ave	9	0.1%	No
109	NE 85th St/114th Ave NE	486	2.7%	Yes
110	6th St/4th Ave	253	0.8%	No
111	Kirkland Ave/3rd Ave	122	0.8%	No
112	Kirkland Way/6th St	851	4.1%	Yes
201	98th Ave NE/Juanita Dr	225	0.8%	No
202	100th Ave NE/NE 124th St	122	0.3%	No
203	100th Ave NE/NE 132nd St	112	0.3%	No
205	Market St/Forbes Creek	234	0.7%	No
206	98th Ave NE/NE 120th Pl	122	0.3%	No
207	Juanita Drive/93rd Ave NE	65	0.2%	No
208	Juanita Dr/97th Ave NE	75	0.2%	No
301	120th Ave NE/NE 132nd St	19	0.1%	No
302	120th Ave NE/NE 130th St	19	0.1%	No
303	120th Ave NE/NE 128th St	37	0.1%	No
304	NE 132nd St/124th Ave NE	37	0.3%	No
306	NE 124th St/ Slater Ave NE	65	0.4%	No
307	Totem Lake Blvd/120th Ave NE	37	0.1%	No
310	NE 116th St/120th Ave NE	19	0.1%	No
311	NE 116th St/124th Ave NE	112	0.5%	No
312	NE 124th St/116th Ave NE	9	0.0%	No
313	NE 124th St/113th Pl NE	19	0.0%	No
314	Slater Ave NE/NE 120th St	28	0.1%	No
315	NE 124th St/124th Ave NE	19	0.0%	No
316	Totem Lake Blvd/NE 132nd St	19	0.1%	No
317	I-405/SB Off NE 124th St	9	0.0%	No
318	I-405/NB Off NE 124th St	19	0.1%	No
319	I-405/SB Off NE 116th St	37	0.2%	No
320	I-405/NB Off NE 116th St	56	0.2%	No
324	NE 128th St/116th Way NE	0	0.0%	No
325	NE 124th St/128th Ln NE	37	0.1%	No
401	NE 85th St/ 132nd Ave NE	65	0.2%	No
402	NE 85th St/124th Ave NE	131	0.8%	No
403	NE 85th St/ 120th Ave NE	112	0.4%	No
404	124th Ave NE/NE 100th St	112	0.3%	No
406	NE 70th St/132nd Ave NE	131	1.3%	Yes
407	NE 70th St/116th Ave NE	337	2.7%	Yes
410	116th Ave NE/I-405 NB Ramp	103	0.4%	No
411	NE 70th Pl/I-405 SB Ramp	655	2.6%	Yes
501	North Holmes Pt Dr NE/Juanita Dr NE	28	0.1%	No
502	South Holmes Pt Dr NE/Juanita Dr NE	37	0.1%	No
503	NE 141st Street/Juanita Dr NE	28	0.1%	No
504	Juanita-Woodinville Way/100th Ave NE	112	0.3%	No
506	Simonds Road/100th Avenue NE	65	0.2%	No
507	NE 145th street/100th Avenue NE	56	0.2%	No
508	NE 145th Street/Juanita-Woodinville Way	37	0.3%	No
510	NE 132nd Street/132nd Avenue NE	28	0.1%	No
511	NE 144th Street/124th Avenue NE	9	0.0%	No
512	NE 124th Street/Willows Road NE	37	0.1%	No

a Total daily trips entering intersection.

b Based on the City of Kirkland Proportional Share Impact Worksheet.

c A significant intersections defined as any intersection where the proportional share is equal to or exceeds 1.0%.

According to the results shown in Table 3, there are 6 intersections that meet the criteria to be defined as a significant intersection, ie., greater than 1%. It is important to note that at one intersection the proportional share project impact exceeds 5%. The remaining intersections are determined not to be significant. The full list shown in Table 3 includes all those intersections reported in the City's concurrency results.

Thus, the six intersections that require additional analysis are:

104	108th Ave NE/NE 68th St
109	NE 85th St/114th Ave NE
112	Kirkland Way/6th St
406	NE 70 th St/132 nd Ave NE
407	NE 70th St/116th Ave NE
411	NE 72nd Pl/I-405 SB Ramp

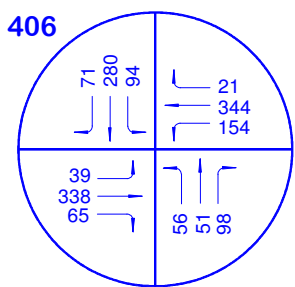
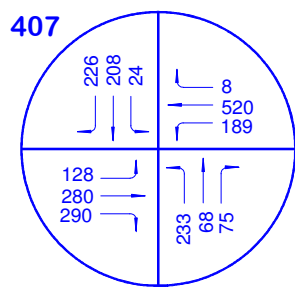
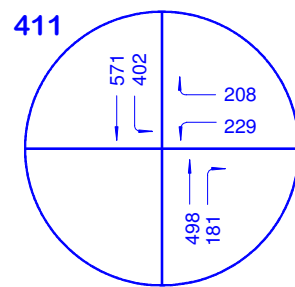
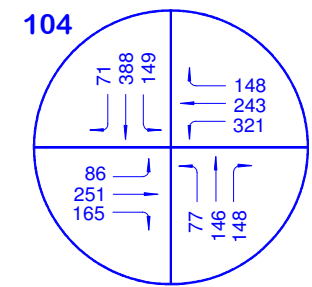
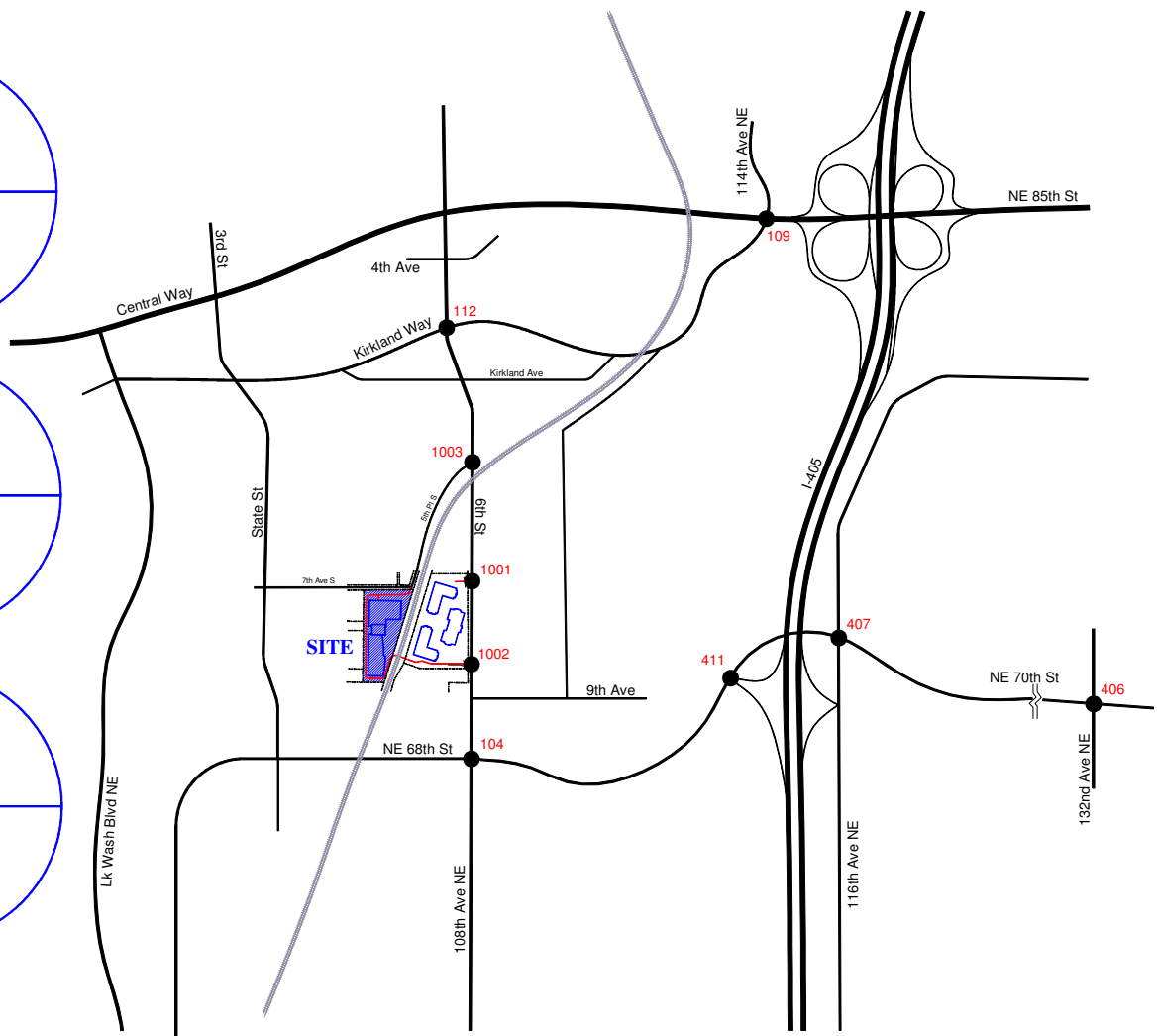
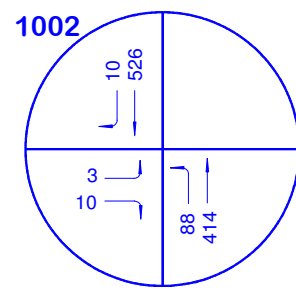
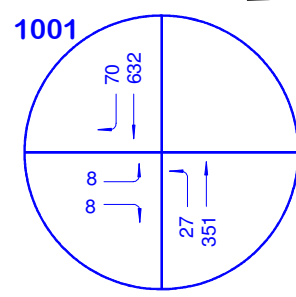
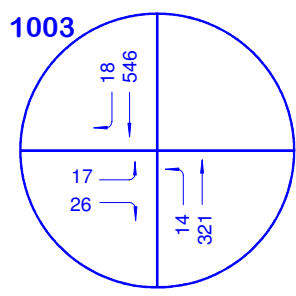
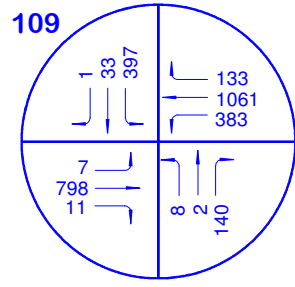
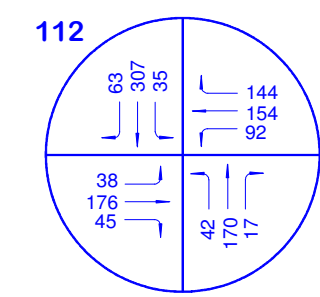
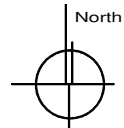
The analysis also includes analysis of the existing south Google driveway and the 6th St S/5th Pl S intersection. For reference, these two intersections are identified in the report and technical appendix as 1002 and 1003. The existing Google north site access intersection is identified as 1001.

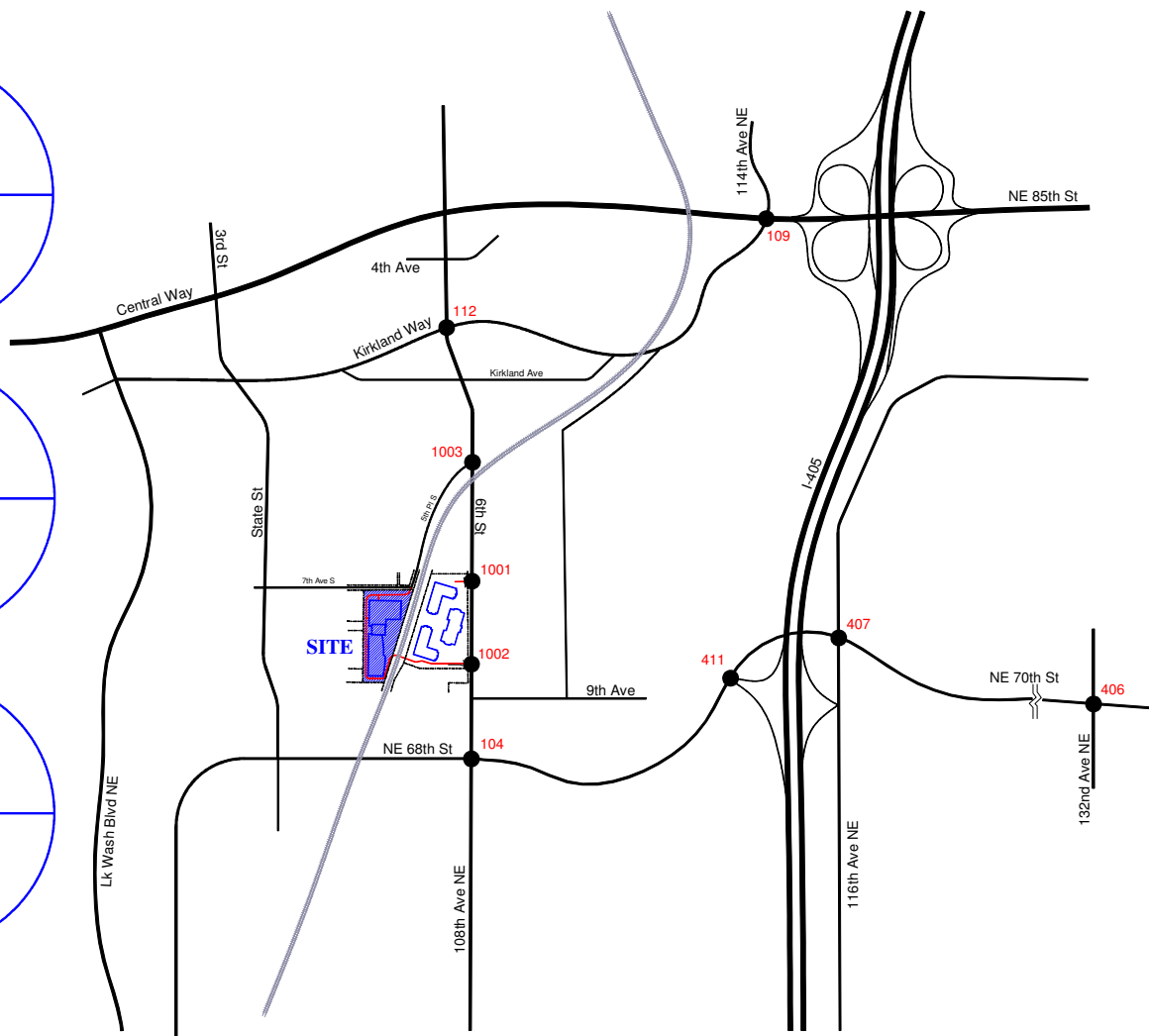
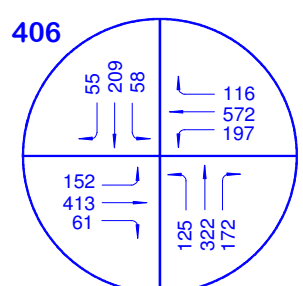
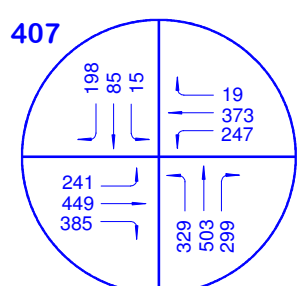
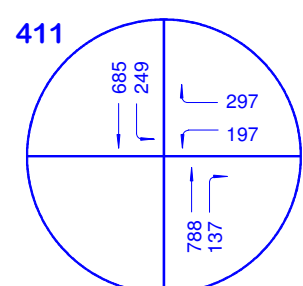
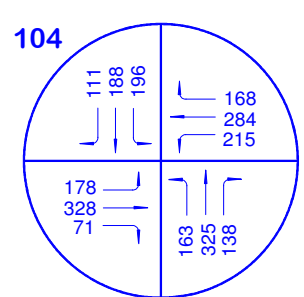
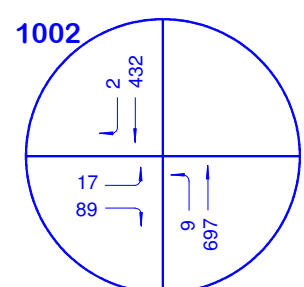
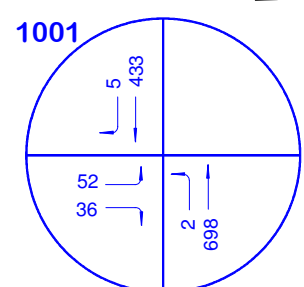
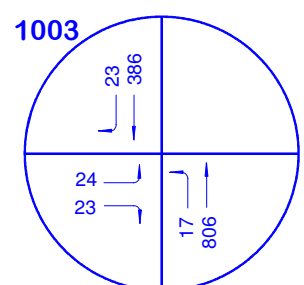
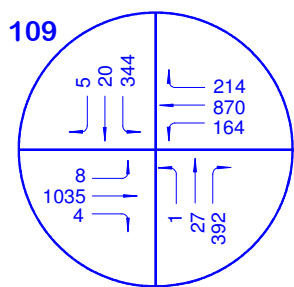
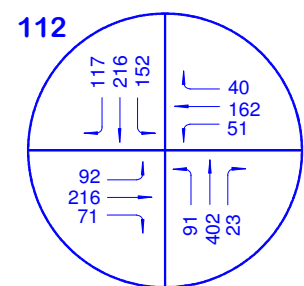
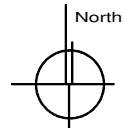
These intersections were analyzed for both the AM and PM street peak periods.

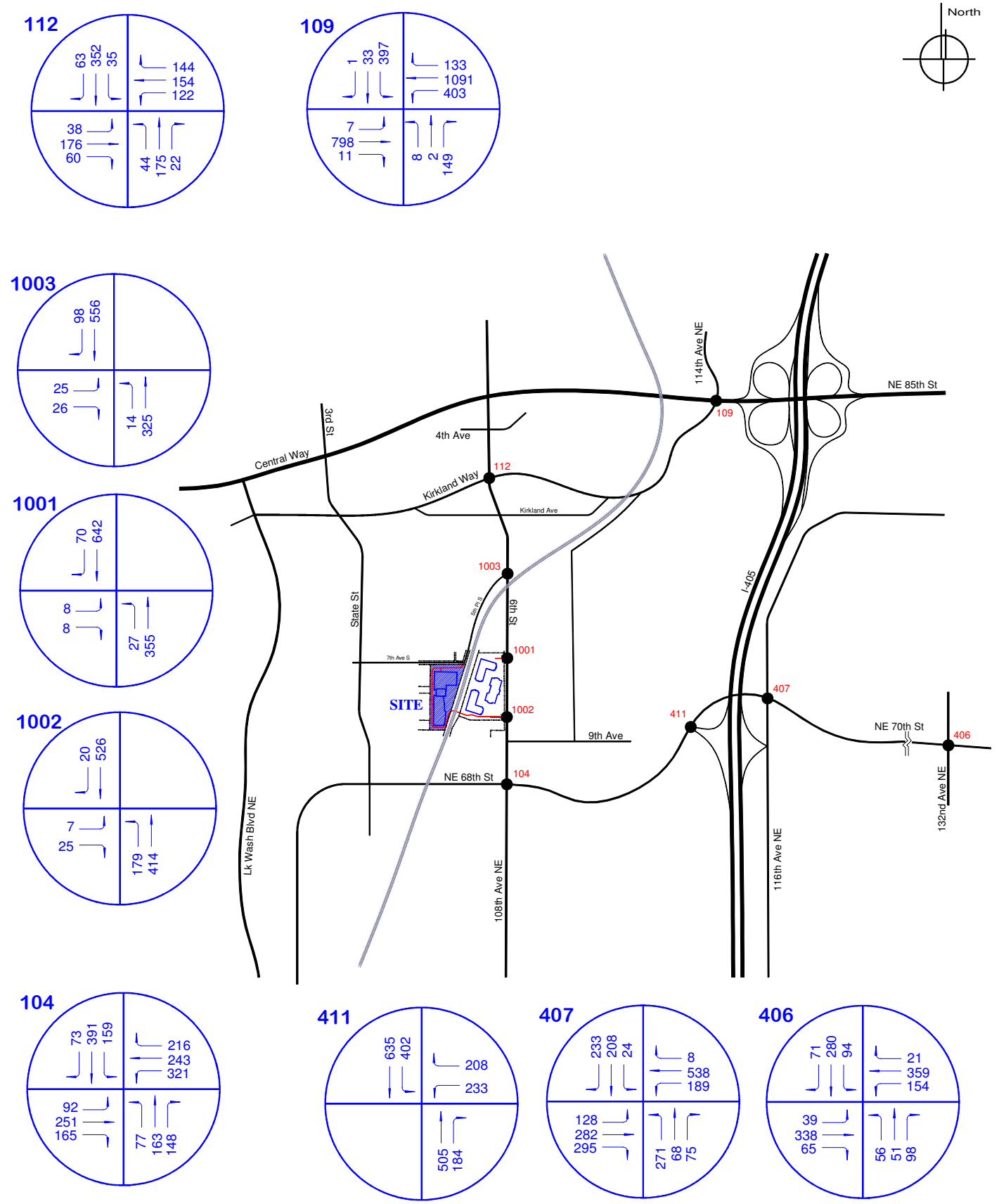
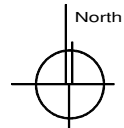
VII. Future Year (Year 2017) Traffic Estimates

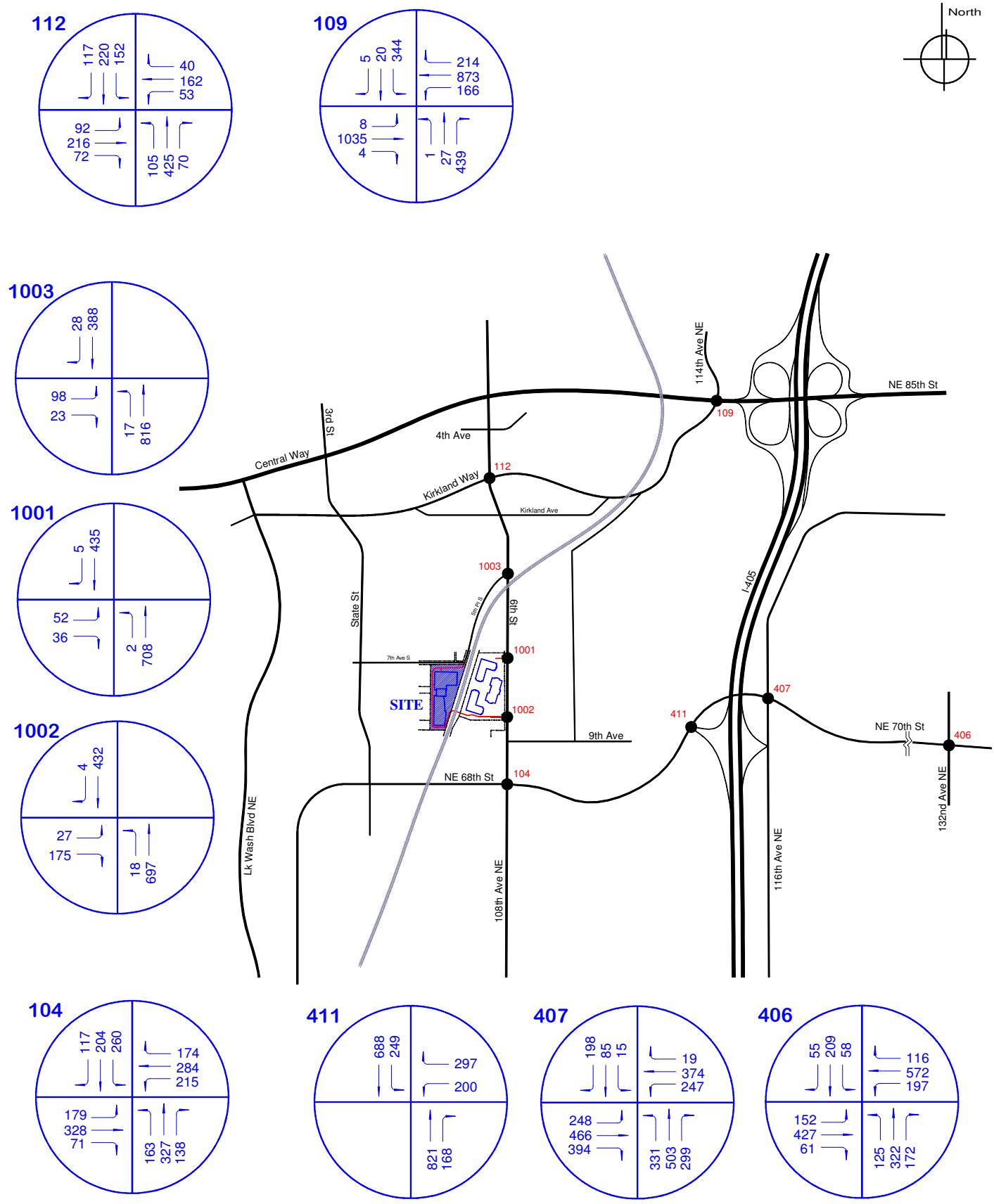
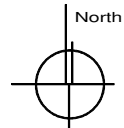
The horizon year of this project is estimated to be 2 to 3 years from today, however, the traffic study assumes a 2017 horizon year to coincide with the concurrency forecasts. The City provided AM and PM peak hour traffic volume forecasts for the year 2017 that included traffic growth from all pipeline projects. The horizon year volumes at the analysis intersections without the project are shown in Figure 7 and 8 for the AM and PM peak hours respectively.

The horizon year turning movement volumes at the analysis intersections with the project are shown in Figure 9 and 10, for AM and PM peak hours respectively. In addition, the AM and PM peak hour driveway volumes are shown in these same figures. It is important to note that since the site is currently occupied with uses that are operational, the future volumes provided by the City would include traffic from these existing uses. Therefore, to correctly estimate the horizon year forecast with project traffic, the existing traffic from the site was backed out of the horizon year with project volume forecasts. These existing trips are relatively insignificant but were nevertheless accounted for.









VIII. Level of Service Analysis

Level-of-service for the existing condition, as well as future conditions, were calculated using the Trafficware Synchro intersection analysis software. It should be noted that both software packages and summary results are per the HCM signalized and unsignalized methodology. The delay as shown represents average delay per vehicle for all approaches at signalized and all-way stop controlled intersections. Note the delay presented for side street stop controlled intersections represents the delay for the critical approach or movement and not the overall intersection.

Level of service was calculated at the study area intersection for existing 2012, 2017 with and without project conditions. The future (year 2017) weekday AM and PM peak hour level of service at the three site access intersections were also computed. The results are shown in Table 4a and 4b.

Table 4a
PM Peak Hour Level of Service

Intersection		Approach/ Movement	2012 Existing LOS (Delay) ^a		2017 without project LOS (Delay) ^a		2017 with project LOS (Delay) ^a	
PM PEAK HOUR ^b								
104	108th Ave NE/NE 68th St	overall	C	33.9	D	35.8	D	40.0
109	NE 85th St/114th Ave NE	overall	C	21.9	C	32.4	D	37.0
112	Kirkland Way/6th St S	overall	D	33.7	F	102.4	F B	143.2 11.3 ^c
406	NE 70th St/132 nd Ave NE	overall	D	38.9	D	43.4	D	43.7
407	NE 70th St/116th Ave NE	overall	D	39.7	D	46.3	D	47.4
411	NE 72nd Pl/I-405 SB Ramp	overall	B	14.8	C	20.4	C	22.0
1001	North Driveway/6th St ^c	EBL/EBR NBL	- -	- -	- -	- -	C A	15.6 8.3
1002	South Driveway/6th St ^c	EBL/EBR SBL	- -	- -	- -	- -	B A	14.7 8.4
1003	6 th St S/5 th Pl S ^d	EBL/EBR SBL	- -	- -	- -	- -	C A	24.1 8.3

a Delay is represented in seconds per vehicle

b Intersections 104, 109, 406, 407 and 411 are signalized. Intersection 112 is an all-way stop. Intersections 1001, 1002 and 1003 are side street stop control.

c Intersections 1001, 1002 and 1003 are stop control for the EB approach. At 1001 and 1002, there are separate left and right turn pockets however the length of pocket is considered too short to be an exclusive lane.

d There is a short eastbound left turn center refuge area and the analysis considers 1 vehicle storage, functioning similar to a two-way left-turn lane. Even though not striped, there is adequate storage for a northbound left turn pocket, also assumes in the analysis.

e CIP project – install signal, and add a northbound left turn pocket.

Table 4b
AM Peak Hour Level of Service

Intersection		Approach/ Movement	2005 Existing LOS (Delay) ^a		2008 without project LOS (Delay) ^a		2008 with project LOS (Delay) ^a	
AM PEAK HOUR ^b								
104	108th Ave NE/NE 68th St	overall	D	35.4	D	37.7	D	37.0
109	NE 85th St/114th Ave NE	overall	C	27.2	C	34.1	C	34.0
112	Kirkland Way/6th St S	overall	C	16.8	E	36.2	F B	60.2 10.6 ^c
406	NE 70th St/132 nd Ave NE	overall	B	19.9	C	20.6	C	20.7
407	NE 70th St/116th Ave NE	overall	D	44.2	D	52.2	E	57.1
411	NE 72nd Pl/I-405 SB Ramp	overall	B	16.1	B	17.9	B	18.2
1001	North Driveway/6th St ^c	EBL/EBR NBL	- -	- -	- -	- -	B A	14.9 9.4
1002	South Driveway/6th St ^c	EBL/EBR NBL	- -	- -	- -	- -	B A	14.1 9.6
1003	6 th St S/5 th Pl S ^d	EBL/EBR SBL	- -	- -	- -	- -	B A	14.9 9.1

a Delay is represented in seconds per vehicle

b Intersections 104, 109, 406, 407 and 411 are signalized. Intersection 112 is an all-way stop. Intersections 1001, 1002 and 1003 are side street stop control.

c Intersections 1001, 1002 and 1003 are stop control for the EB approach. At 1001 and 1002, there are separate left and right turn pockets however the length of pocket is considered too short to be an exclusive lane.

d There is a short eastbound left turn center refuge area and the analysis considers 1 vehicle storage, functioning similar to a two-way left-turn lane. Even though not striped, there is adequate storage for a northbound left turn pocket, also assumes in the analysis.

e CIP project – install signal, and add a northbound left turn pocket.

As shown in Table 4a, the 108th Ave NE (aka 6th St)/NE 68th St intersection, which is currently signalized, is estimated to operate at LOS C for current conditions and LOS D for future conditions with or without the project for the PM peak period. The overall delay increase at this intersection with impact from project traffic is 4 seconds per vehicle. For the AM peak period (Table 4b), this intersection is estimated to operate at LOS D for existing conditions and LOS D for future conditions with or without the project. The overall delay increase with impact from net project traffic is actually a slight reduction, most likely due to adding trips to non-critical movements. The project's proportional share is 5.4%.

The NE 85th St/114th Ave NE intersection, signalized, is estimated to operate at LOS C for current conditions and LOS C for future conditions without and LOS D with the project for the PM peak period. The overall delay increase at this intersection with impact from project traffic is about 5 seconds per vehicle. For the AM peak period (Table 4b), the LOS is C for existing conditions and C for future conditions with or

without the project. The overall delay increase with impact from project traffic is essentially a zero change. The project's proportional share is 2.7%.

The Kirkland Way/6th St S intersection, which is currently an all-way stop, is estimated to operate at LOS D for current conditions, and LOS F for future conditions with or without the project for the PM peak period (Table 4a). The overall delay increase at this intersection with impact from project traffic is about 40 seconds per vehicle. For the AM peak period (Table 4b), the LOS is C for existing conditions, LOS E for future conditions without the project, and LOS F for the with project condition. The overall delay increase with impact from project traffic is about 20 seconds per vehicle. The City currently has an intersection improvement project at this intersection that would include installation of a signal (from an all-way stop) but without any significant widening. The south leg is currently wide enough to accommodate a new left turn pocket thus that was included in the improvement assumption. With these improvements, the 2017 PM peak hour LOS with project is estimated to improve to LOS B for both the AM and PM peak hour scenarios. The project's proportional share is 4.1%.

The NE 70th St/132nd Ave NE intersection is estimated to operate at LOS D for all cases during the PM peak hour. For the AM peak hour, the intersection is estimated to operate at LOS B for existing conditions and LOS C for future conditions. The project's proportional share is 1.3%.

The NE 70th St/116th Ave NE intersection is estimated to operate at LOS D for all cases during the PM peak hour. For the AM peak hour, the intersection is estimated to operate at LOS D for existing and future without project, and LOS E for future with project. The average delay increase with the project is about 5 seconds per vehicle. Improvements would be required at this intersection if the project's proportional share is greater than 15%, which is the standard for LOS E conditions. The project's proportional share is 2.7%.

The NE 72nd Pl/I-405 SB Ramps intersection is estimated to operate at LOS C for existing conditions and LOS D for future conditions with or without the project, for the PM peak hour. The analysis assumes the southbound off-ramp as a two lane approach with an exclusive left and right turn lane even though it is not striped as such, although it is wide enough to accommodate it. The AM peak hour was not analyzed at this intersection. The project's proportional share is 2.6%. Improvements are not required where the LOS is A thru D.

Both project driveways are currently 3-lane driveways with 2 exit lanes. However, the storage distance for each driveway is very short and thus for this analysis each driveway was assumed as a shared left and right approach. All of the critical movements at both driveways for both the AM and PM peak hours are estimated to operate at LOS C or better with the existing striping configurations. As mentioned earlier, no Phase 2 traffic is estimated to use the existing north driveway. The majority of Phase 2 traffic to and

from the north will access 5th Pl S near the junction with 7th Ave S. All of these trips will ultimately be to and from the north via 6th St S at Kirkland Way. None of the project trips are assumed to use 7th Ave S for westerly orientations.

Due to the fact approximately half of the project trips associated with Phase 2 are expected to utilize 5th Pl S for access to 6th St S, an analysis of the 6th St S/5th Pl S intersection was required. Traffic counts were conducted at this intersection in early December 2012 for AM and PM peak periods. With the addition of project traffic at this intersection, the level of service is estimated to be LOS C for PM and LOS B for AM for side street exiting movements. The analysis assumes a 1-car storage in the northbound acceleration/storage lane on 6th St S just north of the intersection.

A simulation of 2017 AM and PM peak hour conditions with the project for the segment of 6th St between NE 68th St and Kirkland Way was conducted using Trafficware SimTraffic software. The results indicate there could be some significant southbound queues extending back (north) from the 108th Ave NE/NE 68th St intersection. This in turn will impact the exiting movement at the Google southerly driveway. This is discussed more in detail in Section IX.

IX. Site Access

A. Site Access Circulation

The site will be served by a continuous access road that circulates around the south, west and north end of the building. Access to the parking garage P1 level will be at the north and south ends of the garage. Access to the P2 level will be from two driveways to the west end of the access road.

At the north end the access road will connect at the 7th Ave S corner junction with 5th Pl S. There is also proposed an emergency connection to 7th Ave S at the west end of the site. The proposed access to 5th Pl S will be such that no project traffic will use 7th Ave S, either entering or exiting the site. Thus, the ultimate design would prevent right turns from the west from entering the site and prevent left turns to the west exiting the site.

At the south end the access road will connect to the south end of the existing campus with ultimate access to 6th St S via the existing south driveway. This access connection from the proposed site to the existing campus will cross the railroad/future trail that separates the existing campus and the proposed campus. The current design of the access road will pass under the existing railroad.

Pedestrian connectivity between the two parcels will include a pedestrian overpass of the existing railroad.

B. Potential Neighborhood Impacts

There are several residential areas in the Houghton area that have potential to be impacted by traffic associated with the project. Residential roadways considered as part of this study include 7th Ave S, 8th St S and Kirkland Ave.

7th Ave S fronts the north end of the site. All of the properties fronting this roadway are residential to the west. The parcel is restricted through title agreements that none of the traffic associated with the project will use 7th Ave S, either entering or exiting. The project is proposing an access to the intersection junction of 7th Ave S and 5th Pl S. The intersection and access design will be made such that no right turns entering the site are feasible from the west and no left turns exiting to the west are permitted. It is estimated that approximately 80 trips will enter the site from the north on 5th Pl S in the morning peak and 75 trips will exit the site to the north on 5th Pl S in the evening peak. As with most office type development, there will be minimal traffic in the non-commute directions.

8th St S has the potential for neighborhood cut-through traffic for trips to and from the north to NE 85th St and I-405 at the north end. The future level of service estimates and congestion (LOS F) at the Kirkland Way/6th St S with an existing all-way stop control could shift project traffic as well as other traffic from land uses south on 6th St S to 8th St S to 9th Ave S. However, it is estimated that with installation of a signal at the Kirkland Way/6th St S intersection, the diversion potential to 8th St S should be effectively mitigated.

Kirkland Ave also has the potential for project cut-through traffic. However, in particular for the AM commute, the potential delay to turn left (westbound to southbound) at the Kirkland Ave/6th St S intersection may result in excessive delay as to negate the benefit of the cut-through. Also, as noted above, with the installation of a signal at the Kirkland Way/6th St S intersection, this cut-through potential should be effectively mitigated.

C. Driveway Queuing

The base estimate of traffic exiting the two existing Google driveways during the PM peak hour is 88 vehicles at the north end and just over 200 at the south end. The vast majority of vehicles at the south driveway are estimated to exit to the south (right turn out).

As noted above in Section VIII, a simulation of 2017 AM and PM peak hour conditions with the project for the segment of 6th St between NE 68th St and Kirkland Way was conducted using Trafficware SimTraffic software. The results indicate there could be some significant southbound queues extending back (north) from the 108th Ave NE/NE 68th St intersection during PM peak hour conditions. The maximum queues observed with simulation was estimated to extend north past the south driveway. This in turn will

have a direct impact on the exiting movements at the Google south driveway. The simulation indicates the maximum queues observed from vehicles exiting the south driveway will extend back to near the railroad/trail overpass.

It is likely that some of the existing Google traffic (from the existing campus) will divert to the north driveway for trips south as well as north as a result of the estimated potential congestion and queuing that could occur at the south driveway with simple addition of the new traffic with the existing traffic. With a shift of some of the existing traffic (10 eastbound left turns from the south driveway to the north driveway and 25 eastbound right turns from the south driveway to the north driveway), the queue at the south driveway (internal exiting the site) is estimated to reduce noticeably. The maximum queues observed with simulation is observed to be balanced with both queues approximately 120 feet in length.

This in turn is estimated to have a slight negative affect on the level of service at the north driveway, but should improve slightly the level of service at the south driveway. The LOS grades as shown in Table 4a are estimated to remain unchanged, however, the delay are estimated to be different.

The eastbound approach queue (maximum observed through simulation) at the 6th St S/5th Pl S intersection is estimated to be approximately 120 feet.

D. Signal Warrants at South Driveway

The south driveway to 6th St S is estimated to be the driveway with the majority of traffic serving both the existing campus as well as Phase 2. The north driveway is estimated to remain relatively unchanged aside from some expected shifts of existing site traffic from the south driveway to the north driveway with added congestion at the south driveway. Traffic associated with the Phase 2 building to and from north will use 5th Pl S to 6th St S thus the existing north driveway should not see any significant traffic from the proposed project.

Therefore, a signal warrant check was conducted only at the existing southerly driveway. The signal warrant analysis was conducted per MUTCD guidelines for Warrants 1A, 1B, 2, and 3. The warrant requires hourly volumes for the major street (6th St S) as well as hourly volumes for the minor street (south driveway).

The hourly volume on 6th St S was obtained from the City. This count was conducted north of NE 68th St and is an average of a two-day count conducted Tuesday July 12, 2011 and Wednesday July 13, 2011. Volumes were recorded by direction however for the signal warrant analysis, only the total volume both directions is needed. The count was adjusted to 2017 using a 1% per year growth rate.

24-hour counts (3 day average, Tuesday thru Thursday) were conducted at both of the existing driveways. The exiting volume at the south driveway was used for this warrant analysis. A daily estimate by hour of day of Phase 2 traffic using this driveway was made based on the hourly percentages for the existing campus traffic exiting the driveway.

The results of the warrant analysis are tabulated below in Table 5. A summary of the warrant calculations are attached in the appendix.

Table 5
Signal Warrant Analysis Summary (Google South Site Access)

Warrant #	Description	Warrant Met?	Comment
1A	Minimum Vehicular Volume	No ^a	See appendix for results
1B	Interruption of Continuous Traffic	No ^b	See appendix for results
1A & 1B	Reduced 1A and 1B conditions	No/No ^c	both conditions must be satisfied at a 20% reduced threshold level.
2	Four Hour Volume Warrant	No ^d	See appendix for results
3	Peak Hour Volume Warrant	Yes ^e	See appendix for results

a threshold volume for side street is 150 vph. There are only 2 of 8 instances where the warrant is met.

b threshold volume for side street is 75 vph. There are only 3 of 8 instances where the warrant is met.

c threshold volume for side street is 120 vph for 1A and 60 vph for 1B. There are only 2 of 8 instances where the warrant is met for 1A and 4 of 8 for 1B.

d threshold volume for side street dependant on major street. In this case, there are 2 of 4 hours that are met.

e threshold volume for side street in this instance is 145 vph. The estimated peak hour volume estimated to be 186 vph. However, approximately 85% of this volume is right turn.

As shown in Table 5, given the traffic volume forecasts, none of the major volume signal warrants are met. Warrant 3 is a special circumstance warrant condition primarily for land uses with high peaking conditions, office park would be one consideration. However, approximately 85% of the right turn volume is right turn exiting.

Signal Warrant #1 is the Eighth-Hour Vehicular Volume Warrant. It consists of three 'sub-warrants' where meeting one of these would satisfy the condition of Warrant 1; Condition A, Condition B, and 80% level for Condition A and B where both conditions must be met to meet this sub-warrant. Assuming a dual lane approach on the major street and a single lane approach on the side street, none of the sub-warrants are met. The three sub-warrants are discussed below:

- For Warrant 1A, it requires that for any 8 hours of a given day, the major street volume shall be equal to or exceed 500 vehicles per hour (vph) both directions and the side street volume shall equal or exceed 150 vph for those same 8 hours. There are only two hours that meet this criteria.
- Warrant 1B requires that for any 8 hours of a given day, the major street volume shall be equal to or exceed 900 vph both directions and the side street volume shall equal

or exceed 75 vph for those same 8 hours. There are only 3 hours that meet this criteria.

- Combination of Warrant 1A and 1B. This combination considers Warrant 1 met if both warrant criteria of 1A and 1B are met at the 80% level. There are 2 hours that meet the Warrant 1A criteria and 4 hours that meet the 1B criteria. Therefore, this combination of warrants is not met.

Signal Warrant #2 is the Four-Hour Vehicular Volume Warrant. It requires that for any 4 non-consecutive hours of a given day, the major street volume and the minor street volume shall fall above the curve threshold. Threshold volume criteria for the minor street vary based on the major street volume. The lowest threshold for the minor street is 80 vehicles. There are two hours that meet or exceed this lower threshold volume, thus this warrant is not met. The fourth highest hourly volume is estimated to be 46 vph.

Signal Warrant #3 is the Peak-Hour Vehicular Volume Warrant. There are two different conditions that if satisfied would meet this warrant.

- Condition A includes three parts and all must be met: 1) the total stopped delay equals or exceeds 4 vehicle-hours for a one-lane approach, 2) the volume on the minor-street exceeds 100 vph for a one lane approach, and 3) the total entering volume during the hour equals or exceeds 650 vph for intersections with 3 approaches.

For Part 1, the estimated total delay for the PM peak hour (critical peak) is approximately 0.73 vehicle hours thus #1 is not met. The delay is based on Synchro results. If the driveway operation is tested with simulation and queue spillback from the 108th Ave NE/NE 68th St intersection, the driveway delay is significantly increased due to potential queue blockage. The driveway delay could be as high as 7 vehicle hours in this instance. However, as noted earlier, if significant delay is realized at the south driveway, some of the existing Google campus employees will likely shift to the north driveway to exit. With a minor shift (10 lefts exiting and 25 rights) of some of the existing campus trips to the north driveway, the south driveway simulated delay is reduced to approximately 1 vehicle hour.

Part 2 is met since the peak hourly approach volume is 200 vph (PM peak hour). And Part 3 is met, since the total entering volume is estimated to be 1,350 vph (PM peak hour). In any case, only 2 of the 3 parts are met, thus Condition A is not met.

- Condition B requires that for any 1 hour of a given day, the major street volume and the minor street volume shall fall above the curve threshold. The threshold for the minor street is 145 vehicles given a major street forecast of 1,215 vph.

There side street approach volume is just over 200 vph, thus this warrant could be considered as met.

It should be noted that the MUTCD guidelines suggest utilizing engineering judgment for any minor street right-turn volume reductions. Since the approach is estimated to be a single lane approach, it was concluded that leaving the right turn volumes in would be appropriate. However, the vast majority of the exiting movement is right turn out (87%) and the delay at the driveway is created more so by the queue spill back from NE 68th St rather than any difficulty in vehicles exiting the driveway. The left turn out movement can make efficient use of the center two way left turn lane. It is expected that in real world situations, vehicles southbound on 6th St S moving in a slow queue would permit alternating entry for the right turn exiting the driveway.

X. On-Site Parking

The total proposed parking is 746 stalls. All of these stalls would be covered parking. This equates to a parking ratio of 1 stall per 241 gross square feet.

According to ITE Parking Generation, 4th Edition, the peak weekday parking demand for general office in a suburban setting is expressed by the equation: $P=2.51(X)+26$; $R^2=0.91$, where P equals occupied parking stalls and X equals gross floor area (kgsf). Utilizing this equation, it is estimated that the peak parking demand will be 478 stalls. This suggests the proposed site will not be under parked. The peak demand is estimated to occur between the hours of 10:00 AM and noon. The demand is estimated to be no less than 80% of peak between the hours of 8:00 AM and 4:00 PM and drops significantly outside these hours.

The ITE average peak period parking demand is 2.84 vehicles per 1,000 gsf. Per the rate the peak demand would be 511 vehicles parked on site in Phase 2.

XI. Transportation Demand Management Plan (TDM)

The transportation demand management (TDM) plan goal is to help achieve mode split goals by reducing the single occupant vehicle (SOV) percentage of office trips from the project thereby reducing the overall SOV travel to and from the site.

The following are examples of TDM strategies:

- Provide a Commuter Information Center (CIC): A CIC would be located in a prominent location, typically in the lobby of the building. A CIC is a transportation

information display in a freestanding, wall mounted, or kiosk configuration, which provides rideshare and transit service information including a destination brochure, targeted specifically to the commuter market. Preferred location will be determined by the BTC.

- **Designate a Building Transportation Coordinator (BTC):** The BTC would be appointed (identified by name and position) by the building or institution owner(s) and/or responsible party(s) prior to issuance of the Certificate of Occupancy. The BTC will be responsible for accomplishing program goals, and will maintain and stock the Commuter Information center. The BTC will be located on the site, available to the building's tenants, and be part of Building Management. The BTC's name, phone number and location will be displayed on the building's directories.
- **Periodic Promotional Events:** A minimum of one promotional event per year is recommended to promote transit and high occupancy vehicle (HOV) use and flextime programs for employees and/or tenants.
- **Ridematch Opportunities:** Depending on the success of the TMP, a ridematch program may be implemented. Ridematch is a Metro's computer-assisted service which matches commuting customers with similar origins, destinations, and work schedules for purposes of forming, joining, or adding to carpools, vanpools, and custom buses.
- **Preferential Parking for HOV's:** Preferential parking could be provided at the building near employee entrances for carpools/vanpools. Preferential parking for HOV's could be provided at a rate of 5% of total office parking stalls. These spaces will be designated specifically for carpools and will have high visibility to encourage program participation. The carpool/vanpool should commute at least four days per week to and from work. These spaces will be reserved for exclusive use by carpools/vanpools between the hours of 7:00 and 10:00 AM. Carpool/Vanpool spaces will be clearly identified with signs and located near the elevator lobby.
- **Incentives for Carpool/Vanpool:** A two-person carpool would receive a 25% discount from the normal monthly parking rate and a three person or larger carpool/vanpool would receive a 50% discount.
- **Transit Subsidy:** A peak hour transit subsidy of 50% could be offered to employees that primarily commute to and from work by bus.
- **Signage:** Signage could be provided in the parking lot giving preferential treatment for carpools and vanpools.
- **Bicycle Racks -** Provide weather protected lockable bicycle racks and/or hangers to be used by employees and/or visitors.

- Showers/Dressing Rooms: Project should provide both Men and Women's showers and dressing rooms which can be utilized for those walking or bicycling to work.

XII. Summary

Google Phase 2 Office Complex is a proposed 180,000 gsf office park development located south of 7th Ave S and west of the existing Google Campus. The site is located west of the railroad tracks which will separate the two Google sites.

The following are the summaries of this traffic study.

A. Trip Generation, Trip Distribution & Assignment

The Phase 2 Google Office Building is estimated to generate a total of 1,684 daily, 207 AM and 180 PM peak hour trips to and from the site. The site is currently vacant.

The assignment of trips was divided approximately even or trips to and from the south as well as those to and from the north. All of the project trips are expected to use 6th St S. The trips to and from the north are estimated to use 5th Pl S for access to the north end of the site, and trips to and from the south are estimated to use the existing south Google driveway to the south end of the proposed site.

In general with most office parks, the split of traffic entering and exiting the site during the morning period is typically 90% entering. Similarly for the afternoon/evening period, the split of traffic entering and exiting the site is typically 90% exiting. It should be noted that Google traffic and employee pattern suggest that most Google employees arrive later in the morning period than typical street peaks and leave slightly later than the afternoon/evening peaks. Given the large amount of employee amenities on site, it is expected that most employees likely stay on site during breaks and lunch periods.

B. Concurrency, Significant Intersections

Based on the concurrency test, this project passed concurrency. There are six significant intersections defined based on the proportional share impact calculations. These intersections include:

- 108th Ave NE/NE 68th St (#104); Proportional Share = 5.4%
- NE 85th St/114th Ave NE (#109) ; Proportional Share = 2.7%
- Kirkland Way/6th St (#112) ; Proportional Share = 4.1%
- NE 70th St/132nd Ave NE (#406) ; Proportional Share = 1.3%
- NE 70th St/116th Ave NE (#407) ; Proportional Share = 2.7%
- NE 72nd Pl/I-405 SB Ramp (#411) ; Proportional Share = 2.6%

The project's proportional share impact at each of these intersections is greater than 1% but less than 5% except for the 108th Ave NE/NE 68th St intersection where the project's impact is just over 5%.

C. Level of Service

Off-Site Intersections – with Significant Impact

Only one intersection is estimated to operate at LOS F in the future (2017) with or without the project. This intersection is:

- Kirkland Way/6th St (#112)

Since the project's proportional share impact is less than 5% at this intersection, which is the threshold percentage for LOS F conditions, the project is not required to provide direct mitigation towards improving the level of service. However, this intersection is currently planned for signal improvements.

The NE 70th St/116th Ave NE intersection is estimated to operate at LOS E for the PM peak hour in 2017 with the project. The project's proportional share impact at this intersection is 2.7% which is less than threshold 15% for required mitigation improvements for LOS E conditions, thus no improvements are suggested.

The mitigation fees that will be required per City ordinance based on the project's floor area are assumed to provide assistance in the form of traffic mitigation towards the City's roadway/intersection improvement projects for the problem analysis intersections.

Site Access Driveways

Both project driveways are estimated to operate in the LOS B/C range for both AM and PM peak hours.

6th St S/5th Pl S

5th Pl S will serve as the northerly access for the proposed site for access to 6th St S. The intersection is estimated to operate in the LOS B/C range for both AM and PM peak hours.

D. Driveway Queue

It is estimated that the southbound queue at the 108th Ave NE/NE 68th St intersection will extend back to the existing south driveway at the site during PM peak periods. The driveway queue exiting the site during the PM peak will thus be affected. It is estimated that with Phase 1 and Phase 2 cumulative Google traffic estimates at the south driveway, the exiting queue could extend back to the railroad track undercrossing. However, with this estimated queue and subsequent congestion observed during for peak hour simulation, it is likely that some of the existing Google building traffic will shift to the north driveway. With a minor shift of 10 trips exiting to the north and 25 trips exiting to the south both to the north driveway, the queue estimates at both driveways are estimated to balance with reasonable queues estimated at each; both at approximately 120 feet (5 cars). The delay estimates are estimated to remain in the LOS B/C range without queue blockage on the mainline southbound.

E. Signal Warrants

Several signal warrants were analyzed for vehicular volume conditions, ie., no pedestrian warrants or accident situations. The warrants included Warrant 1A, 1B, 2, and 3. The volume forecasts indicate Warrants 1A, 1B (and combination 1A/1B), and 2 are not met. Warrant 3 is a special circumstance warrant for heavy peak hour conditions. This warrant is met. However, special consideration should be given prior to installation of a signal. The predominant volume exiting the site is right turns, 87% to be exact. The estimated driveway delay is LOS C assuming no impacts from adjacent intersections. However, in this case, based on a traffic simulation test, it is estimated the southbound queue at the 108th Ave NE/NE 68th St could spill back to the south driveway thus creating congestion/blockage for vehicles exiting this driveway. If this tends to hold true, it is likely that some of the existing campus Google employees would shift to the north driveway for exiting in the PM peak period. A minor shift is estimated to relieve some of the south driveway congestion, however, Signal Warrant 3 Condition B would still be met.

F. Mitigation Fee Analysis

Per City Ordinance No. 3685, road impact fees will be required. Fees must be paid prior to issuance of building or tenant improvement permit. According to the City's current Road Impact Fee schedule (Sept 22, 2010), the fee for general office is \$7.40 per gsf (GFA).

The estimated fee based on a project gross floor area of 180,000 gsf would equate to a traffic mitigation fee in the amount of \$1,332,000. It is understood that the City will allow credit against the traffic mitigation fee for improvements that may be required to be constructed by the project at the Kirkland Way/6th St S intersection.

G. Frontage Improvements

The project will construct frontage improvements on 7th Ave S including new curb, gutter, planter strip with landscaping, and sidewalk. Improvements will also require design of the access to the 7th Ave S/5th Pl S junction such that all project traffic to and from the site will be prevented from using 7th Ave S.